Body Heat Powers EnOcean Sensors – Radio transmitter demo with EDK 312 Thermo Kit

Step 1: Assembly with three soldering points

Only three components are necessary to realize a temperature-powered radio transmitter: The all-in-one sensor module STM 312, the ultra-low-voltage DC/DC converter ECT 310 and the low-cost Peltier element TEC-2L. All three components are part of the EDK 312 evaluation kit from EnOcean. Figure 1 shows the corresponding block diagram, Figure 2 shows the assembly of the thermo-powered wireless sensor: Only three small soldering points are needed - start-up in seconds!

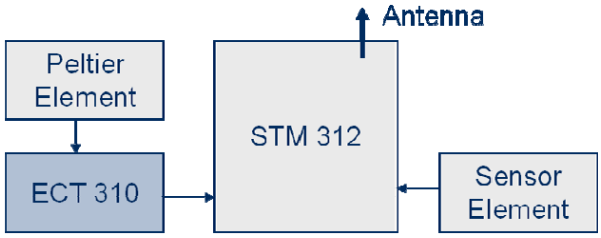

Fig 1: Thermo-powered wireless radio

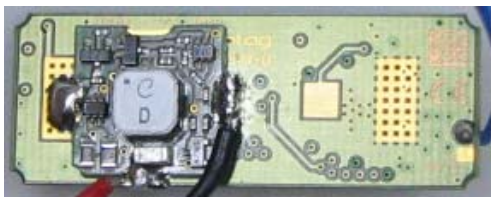

Fig 2: Assembly with 3 soldering points

Step 2: Heat energy from the finger

As shown in Figure 3, hold the thermocouple with your thumb (or even better with the always warmer inside wrist) onto a cold surface. A metal surface is usually good suited to be colder compared to the finger temperature, which is very individual. Note: Ensure correct orientation of the lead wires of the Peltier element! The red wire must be left side next to the black wire (so that the Peltier element provides the correct voltage direction). If necessary turn Peltier element simply upside-down.

Step 3: Send radio telegram

As shown in Figure 3, now hold the STM 312 radio module with the other hand and press the learn button in some cyclic time distances. Once enough heat energy has been collected, the red LED next to the antenna blinks when you press the learn button signaling that a radio message was sent. Typically, enough energy and so the transmission function

is given within a few seconds after the thumb was placed onto the Peltier element. If not so, please increase temperature difference and / or check polarity of the Peltier element.

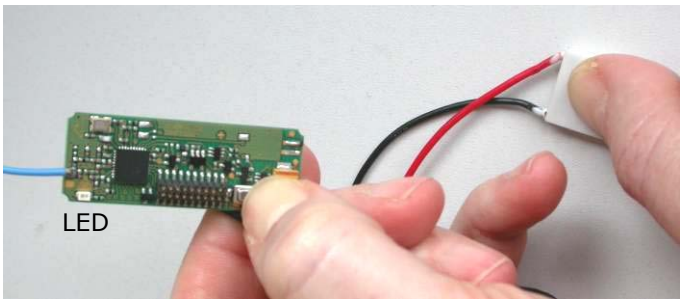

Fig 3: Operating a radio telegram

Other evaluation options with test board EVA 330

In the EDK 312 evaluation kit additionally the test board EVA 330 is contained. The module assembled during Step 1 can be easily plugged onto this board as shown in Figure 4 and a simple sensor system can be simulated by rotating the potentiometer. In addition, all major plug connectors of the STM 312 module are passed out to a through-hole grid row for easy external access and connecting. On availability of sufficient energy (measurable with a voltmeter between the outputs VDD and GND), sending of telegrams is either cyclically every 100 seconds (according to the initial factory parameterization of the STM 312 module), and immediately by pressing the WAKE button. To parameterize or program the STM 312 module, the programming adapter of the EnOcean development kit EDK 300 (separately available) can be connected to the large test board connector. Details can be found in the EDK 300 User Manual. The EDK 300 development kit software also provides the convenient visualization and logging of radio telegrams send from the STM 312.

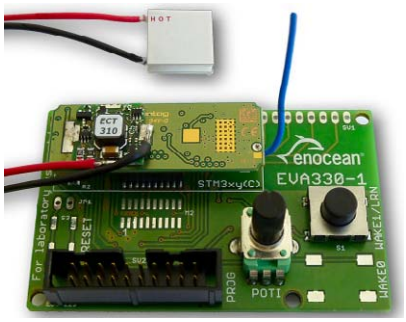

Fig 4: Further evaluation using the test board EVA 330

Disclaimer

The information provided in this document describes typical features of the EnOcean radio system and should not be misunderstood as specified operating characteristics. No liability is assumed for errors and / or omissions. We reserve the right to make changes without prior notice. For the latest documentation visit the EnOcean website at **www.enocean.com**.